CALIFORNIA
ENERGY
COMMISSION

AN ASSESSMENT OF CALIFORNIA'S PETROLEUM INFRASTRUCTURE NEEDS

In Support of the 2005 Integrated Energy Policy Report

Staff Report

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Introduction and Scope

California must have a sufficient supply of transportation fuels to ensure a robust economy, allowing citizens and businesses maximum mobility. For the *2005 Integrated Energy Policy Report*, the California Energy Commission (Energy Commission) is examining numerous transportation policy options designed to reduce petroleum use, including alternative fuel and efficiency measures. However, the Energy Commission recognizes that the state will rely to a large degree on petroleum fuels for the foreseeable future. State transportation energy needs, therefore, require an adequate petroleum infrastructure.

In fact, demand for petroleum fuels is rising at a higher rate than supply produced by California's refineries. This means that imports of petroleum fuels into the state will increase. In addition, crude oil imports will continue to increase as extraction in the state declines.

Imported crude oil and petroleum products enter through California's ocean port facilities, primarily in the Los Angeles Basin and the Bay Area, from where the state's petroleum infrastructure—refineries, pipelines, distribution terminals, and marine facilities—delivers petroleum fuels to citizens and businesses.

In the *2003 Integrated Energy Policy Report*, (*2003 Energy Report*), the California Energy Commission noted that portions of the state's petroleum infrastructure, particularly marine facilities, were constrained, and that this could lead to supply problems.[1] The report called for a comprehensive evaluation of California's petroleum infrastructure.

A constrained infrastructure leads to higher operating costs for the industry and, ultimately, higher prices for consumers. In addition, constraints can prevent additional supplies of transportation fuels from reaching California consumers in a timely fashion during a refinery outage or other supply disruption.

This report provides an assessment of all petroleum-related infrastructure in the state, including refineries, pipelines, distribution terminals, and marine infrastructure. However, the focus is on the state's marine facilities. The analysis in this report relies on interviews conducted with market participants and government agencies, along with data collected by the Energy Commission, the State Lands Commission, and others. In addition, a market simulation model was used to gain insights into potential constraints that may develop as demand and fuel imports increase.

Key Staff Findings

The outlook for the adequacy of the state's petroleum infrastructure has improved somewhat since 2003. During this time, the petroleum industry has committed to a variety of projects that will expand portions of the infrastructure. In addition, demand for petroleum fuels is not expected to grow as rapidly as was projected for the *2003 Energy Report*, due mainly to lower forecast population growth. The implementation of new greenhouse gas regulations would further reduce demand and therefore new infrastructure requirements.

However, potential problems remain, and further infrastructure expansion will be required over the next 20 years. The staff's analysis yielded several findings relating to petroleum infrastructure, divided into general (qualitative) and quantitative assessments.

General Assessment

- Portions of California's infrastructure system, especially storage facilities and some segments of the pipeline system, are and will continue to be highly utilized, increasing operating costs for the petroleum industry.

- Existing marine infrastructure could be diminished as a result of continued pressure to remove petroleum facilities, especially in the Los Angeles Basin, and the requirements of new State Lands Commission standards for petroleum marine terminals. The new standards will affect primarily marine terminals equipped to receive clean fuels in the Los Angeles Basin. If some facilities are forced to close but are able to relocate within the same area, operational costs could increase because alternative sites may not have the same access to the petroleum infrastructure network.

- Over the next 20 years, California's infrastructure will require expansion in petroleum marine terminal capacity, marine storage, and the gathering pipelines that connect marine facilities and refineries to the main product pipelines. The main pipeline system may require slight expansion. Most of the expansion in marine terminal and marine storage capacity will be required in the Los Angeles Basin.

- Expansion of petroleum marine infrastructure will be more difficult in the Los Angeles Basin because available land is very scarce. In addition, local authorities do not appear to place a high priority on such expansion.

- The shallow depths of the San Francisco Bay are and will remain a constraint to imports, especially in the case of the larger foreign crude oil shipments, on which the state will rely to an increasing degree.

Quantitative Assessment

The following findings are based on staff projections of California crude oil extraction and petroleum fuel supply and two forecasts of petroleum fuel demand.[2] The Energy Commission base case demand forecast assumes that new greenhouse gas regulations are implemented while the Energy Commission alternative forecast does not.

Imports of crude oil into California are expected to rise by around 75 million barrels per year by 2015 and 140 million barrels per year by 2025. In the base case fuel forecast, annual imports of combined gasoline, diesel, and jet fuel are projected to rise by about 2 billion gallons in 2015 and 3 billion gallons by 2025. In the alternative forecast, annual imports of combined gasoline, diesel, and jet fuel are projected to rise by almost 4 billion gallons in 2015 and almost 6 billion gallons by 2025.

Assuming no significant loss in existing petroleum infrastructure assets:

- In the base case forecast, the Los Angeles Basin will require at least an additional 2.8 million barrels of marine storage by 2025 if current expansion plans are carried out. In the alternative demand case, additional storage needs increase to 7.3 million barrels. Additional clean fuels marine terminal capacity of at least 46 million barrels of throughput per year will be required in the Los Angeles Basin in the base case and 99 million barrels in the alternative demand case by 2025.

- In the base case forecast, marine clean fuels storage needs appear to be met for the next 20 years in the Bay Area, assuming current expansion plans are carried out. In the alternative demand case, at least 700,000 barrels of additional storage capacity will be required by 2025. Additional clean fuels marine terminal capacity of at least 11 million barrels of throughput per year will be required in the Bay Area in the base case and 25 million barrels in the alternative demand case by 2025.

- Crude oil import capacity in the Los Angeles Basin appears to be sufficient for the next 20 years, assuming current expansion plans are carried out. The Bay Area will likely need additional crude oil marine terminal capacity equivalent to around 20 million barrels per year of product throughput by 2025.

Recommendations

The staff believes that the Energy Commission can play an important role in ensuring that overall state needs are taken into account when local infrastructure decisions are made. With this in mind, and based on the analysis in this report, the staff offers the Committee the following recommendations to consider:

- The Energy Commission should propose a new requirement to be incorporated into law that allows state appeals in the petroleum marine infrastructure lease renewal process in the Ports of Los Angeles and Long Beach.

- Energy Commission representatives should participate whenever possible in workshops and public forums to provide information on, and stress the role of, the petroleum infrastructure in the health of the California economy. Other government agencies and the public appear to have a low level of awareness of the critical role that petroleum infrastructure plays in ensuring an adequate supply of transportation fuels.

- The Energy Commission should involve local and state agencies to a greater degree in petroleum infrastructure planning efforts as part of the Commission's *Integrated Energy Policy Report* process. These efforts should encompass not only infrastructure expansion but also infrastructure relocation for facilities that may be denied lease renewal.

- The Energy Commission should also stress to local and state authorities the connection between infrastructure expansion requirements and measures that reduce demand for petroleum fuels, as shown in this report by the impact of the greenhouse gas regulations.

- To help ensure that independent traders are not unfairly denied access to the California fuels market, the Energy Commission should propose an arbitration mechanism for the state, backed by decision making authority, to resolve access issues.

- The Energy Commission should monitor the impact of the State Lands Commission Marine Oil Terminal Engineering and Maintenance Standards, especially on clean fuels marine terminals in the Ports of Los Angeles and Long Beach, and monitor the availability of petroleum vessels.

- The Energy Commission should press for a firm federal funding mechanism to maintain an adequate depth in the Pinole Shoal in San Francisco Bay.

- The Energy Commission should develop “best permitting practices” for petroleum infrastructure projects.

- The Energy Commission should serve as a permit facilitator to ensure that statewide interests are considered in permitting processes by coordinating multiple agency reviews.

- The Energy Commission should consider a statewide one-stop permitting process for petroleum infrastructure projects that cross jurisdictional boundaries. Such projects would likely benefit from a procedure that consolidates environmental review for all jurisdictions in a single process.

Description of California's Petroleum Infrastructure

The state's petroleum fuels infrastructure and distribution system falls into three main categories:

- Refineries
- Pipelines and distribution terminals
- Marine facilities

The California petroleum fuels market is divided into southern and northern California components, with products supplied through the Los Angeles Basin and the San Francisco Bay Area (Bay Area), respectively, although smaller refineries operate in Bakersfield and on the Central Coast. Each of the three infrastructure categories is described separately by region.

Refineries

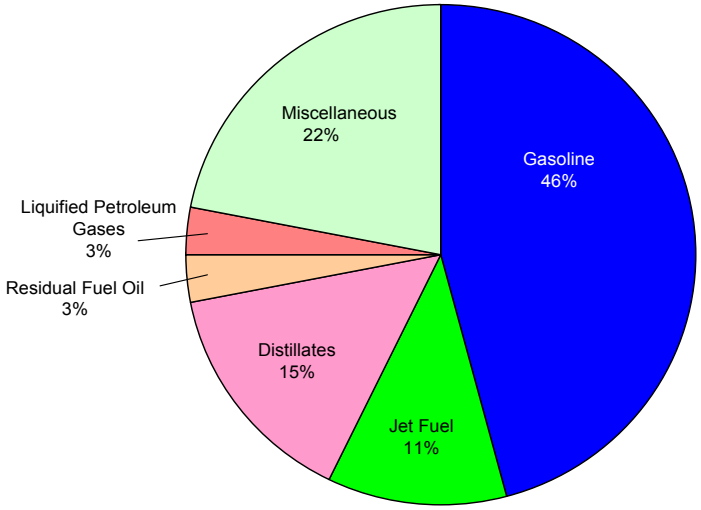
California's petroleum refineries produce many different commodities from crude oil, including transportation fuels. These products can be classified into six groups:

- Liquefied petroleum gases, such as butane and propane
- Gasoline
- Jet fuel
- Distillates, including diesel and high-sulfur distillate fuel oil
- Residual fuel oil, used to power ships and generators
- Miscellaneous products

Miscellaneous products include petroleum coke, petrochemical feedstocks,[3] asphalt and road oils, lubricants, waxes, and solvents. Figure 1 shows the relative amounts of petroleum products produced from crude oil in California refineries in 2004. This report focuses on the primary transportation fuels, gasoline, diesel, and jet fuel, which are referred to as "clean" fuels.[4]

Currently, 21 petroleum refineries operate in California, 10 of which are located in the Los Angeles Basin and 5 in the Bay Area. These two refining centers process over 90 percent of California's crude oil input. Of the remaining six refineries, three operate in Bakersfield, two in Santa Maria, and one in Oxnard. Fourteen of the 21 refineries produce California Air Resources Board (CARB) gasoline and diesel, with the remainder dedicated mainly to non-fuel products such as lubricants and asphalt. Figure 2 shows refinery locations, and Table 1 lists

Figure 1
California Refinery Output in 2004 by Product Type



Source: California Energy Commission *Petroleum Industry Information Reporting Act* (*PIIRA*) *Database*

Figure 2

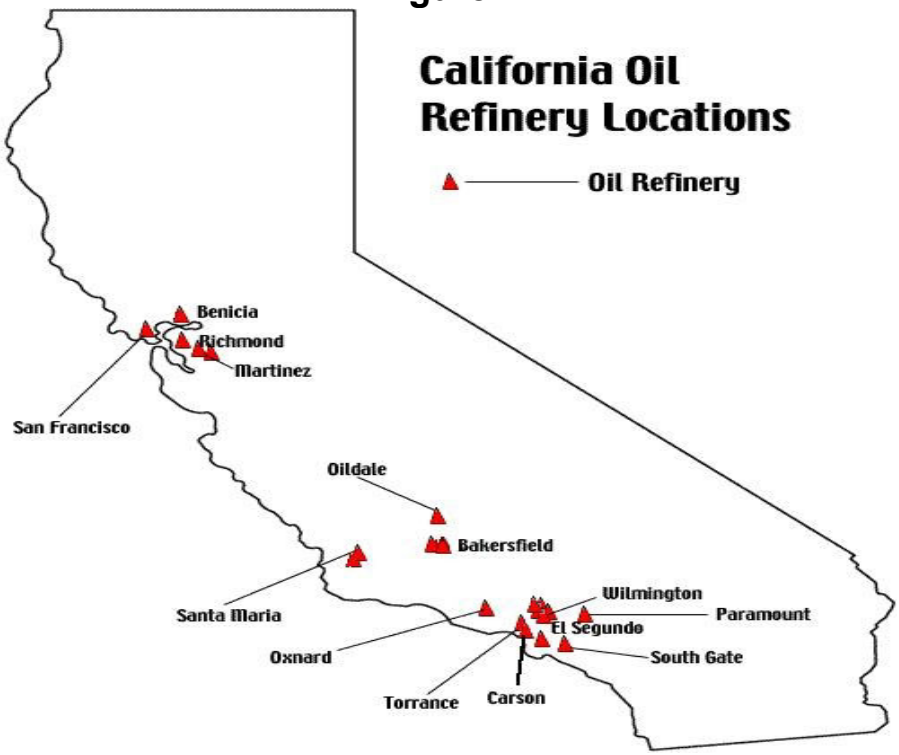


Table 1
California Refineries, Locations, Crude Oil Processing Capacities, and CARB Fuel Capability

Company Name	California Location	Crude Oil Processing Capacity Barrels per Day	2005 CARB Gasoline and Diesel Production
Big West	Bakersfield	66,000	Yes
BP	Carson	260,000	Yes
ChevronTexaco	El Segundo	260,000	Yes
ChevronTexaco	Richmond	225,000	Yes
ConocoPhillips	Wilmington	136,600	Yes
ConocoPhillips	Rodeo	73,200	Yes
ConocoPhillips	Santa Maria	41,800	No
Edgington	Long Beach	26,000	No
ExxonMobil	Torrance	149,000	Yes
Greka Energy	Santa Maria	9,950	No
Kern Oil	Bakersfield	24,700	Yes
Lunday Thagard	South Gate	8,100	No
Paramount Petroleum	Paramount	50,000	Yes
San Joaquin Refining	Oildale	24,300	No
Shell Oil	Martinez	159,250	Yes
Shell Oil	Wilmington	98,500	Yes
Tenby, Incorporated	Oxnard	2,800	No
Tesoro	Martinez	166,000	Yes
Valero	Benicia	144,000	Yes
Valero (Ultramar)	Wilmington	80,887	Yes
Valero	Wilmington	5,770	No
State Totals		2,011,857	

Source: California Energy Commission *PIIRA Database*

California refineries, the cities in which they are located, crude oil processing capacities, and CARB gasoline and diesel capability. The largest refiners, BP in Carson and ChevronTexaco in El Segundo, have a crude oil processing capacity of over 250,000 barrels per day each; the smallest, the Tenby facility in Oxnard, can process less than 3,000 barrels daily.

In southern California, the refineries are concentrated two to five miles north of the Port of Los Angeles, along with ExxonMobil in Torrance and ChevronTexaco's El Segundo refinery near Santa Monica Bay. The Los Angeles

Basin is the origin of pipeline deliveries of gasoline, jet fuel, and diesel to other parts of southern California, Nevada, and Arizona, with deliveries distributed through the Watson Station, or "hub." Fuels also are trucked directly from refineries or nearby product terminals to local retail outlets.

In northern California, the refineries are concentrated in the northeastern part of the San Francisco Bay, in Richmond, on San Pablo Bay, and along the Carquinez Strait. The refiners and terminals are connected through proprietary and common carrier[5] pipelines that deliver both clean fuels and crude oil. Clean fuels are distributed to other parts of northern California and Nevada through a common carrier pipeline system using Concord station as the hub.

Refineries outside of the Los Angeles Basin and Bay Area rely almost entirely on trucking for product distribution, with the exception of the Big West (formerly Shell) refinery in Bakersfield, which distributes refined product to a Fresno terminal via pipeline.

Refinery facilities include storage tanks used for a variety of purposes, including storing crude oil prior to processing, storing intermediate petroleum compounds from a process unit, and storing blending components used to create finished gasoline. In addition, refiners use storage tanks to hold finished product prior to distribution into the pipeline system or for longer periods of time so that inventory can be drawn down during a refinery outage, planned maintenance, or period of high demand.

Pipelines and Distribution Terminals

Crude oil is delivered to different regions of California through a network of pipelines that carry it from both onshore and offshore oil wells to petroleum refineries. The main crude oil pipelines transport it from the southern San Joaquin Valley to refineries in the Bay Area, the Los Angeles Basin, and Bakersfield. In addition, pipelines connect the refineries in Santa Maria and Oxnard to the rest of the system and transfer imported crude oil from marine terminals to refineries. A pipeline bringing crude oil into the state from outside has not yet been built, so imported crude oil must be brought in through marine facilities.

Clean fuels produced in state or imported are transferred to around 70 distribution terminals located throughout California via clean fuel pipelines; from these terminals, fuel is trucked to retail outlets. The pipeline system in northern California connects the Bay Area refineries to distribution terminals located in Sacramento, Chico, Reno, Stockton, Fresno, San Jose, Oakland, and South San Francisco. Fresno is also connected by pipeline to the Big West refinery in Bakersfield. Refineries in the Los Angeles Basin are connected by pipeline to distribution terminals in Los Angeles, San Diego, Imperial, Barstow, Las Vegas,

Phoenix, and Tucson. In addition to the main clean product pipelines, a network of gathering lines connects marine facilities, refineries, and other storage facilities to the main pipelines. Pipelines also distribute jet fuel, produced in refineries or imported from outside California, to the major airports and some military bases.

Most of the clean fuel pipeline systems in northern and southern California are owned by Kinder Morgan, a common carrier pipeline company. Figures 3 and 4 show the Kinder Morgan pipelines systems in northern and southern California, respectively. The two systems are not connected by pipeline, and, as with crude oil, no pipeline delivers clean fuels to California from out of state.

Figure 3
Northern California Kinder Morgan Pipeline System

Source: Kinder Morgan

Figure 4
Southern California Kinder Morgan Pipeline System

Source: Kinder Morgan

Clean fuels are normally delivered to retail outlets by tanker trucks from a distribution terminal equipped with a “truck rack,” which feeds gasoline, diesel, and jet fuel into the trucks through a set of hoses. Distribution terminals include storage tanks used to hold refined product before it is dispensed into tanker trucks. The tanks fluctuate between full and empty, coinciding with the delivery of refined products by pipelines. Storage tank capacity is optimized to accommodate the largest weekly delivery of refined products expected in the course of a year.

Jet fuel is distributed at the major airports through on-site storage facilities, fed by the same clean fuels pipeline systems. The exception is Los Angeles International Airport, where a dedicated pipeline runs directly from the Port of Los Angeles to storage tanks at the airport.

Marine Facilities

Marine facilities for crude oil and refined petroleum fuels include marine terminals, which consist of berthing locations (docks, wharves, etc.), adjacent storage tanks, and a network of pipelines to transfer petroleum products to and from marine vessels. In addition, non-adjacent storage tanks connected by pipeline to a marine terminal are considered part of the marine infrastructure. These facilities are used to import crude oil, other raw materials, and finished products and to export petroleum products to other states along the West Coast and to foreign destinations. Almost all of California's refineries have their own proprietary berth and marine storage or nearby access to those of a third party.

Facilities for importing and/or exporting crude oil and refined fuels are available in 46 marine terminals in California, 39 of which are located in the two major refining centers. The other seven marine terminals, in San Diego, Ventura, and Humboldt counties, are not directly linked to refineries. These terminals are used to ship and receive products in areas that are not served by pipelines.

In the Bay Area, marine facilities are located mainly in the northeastern parts of the San Francisco Bay, near the refineries. Northern California has historically been a net exporter of petroleum products, exporting not only to other western states and foreign destinations but also to the Los Angeles Basin. However, imports are increasing relative to exports, and the Bay Area may soon become a net importer (that is, more imports than exports).

In the Los Angeles Basin, the bulk of marine facilities, in the Ports of Los Angeles and Long Beach, also are located near most of the major refineries. In addition, ChevronTexaco operates a marine facility on Santa Monica Bay. Southern California already is a net importer of clean fuels, with these imports expected to grow steadily. The Ports of Los Angeles and Long Beach also receive the largest share of crude oil and petroleum product imports into the state, and are the only California ports accessible by today's large crude oil tankers, known as "Very Large Crude Carriers."

Outlook: Demand, Production, and Imports

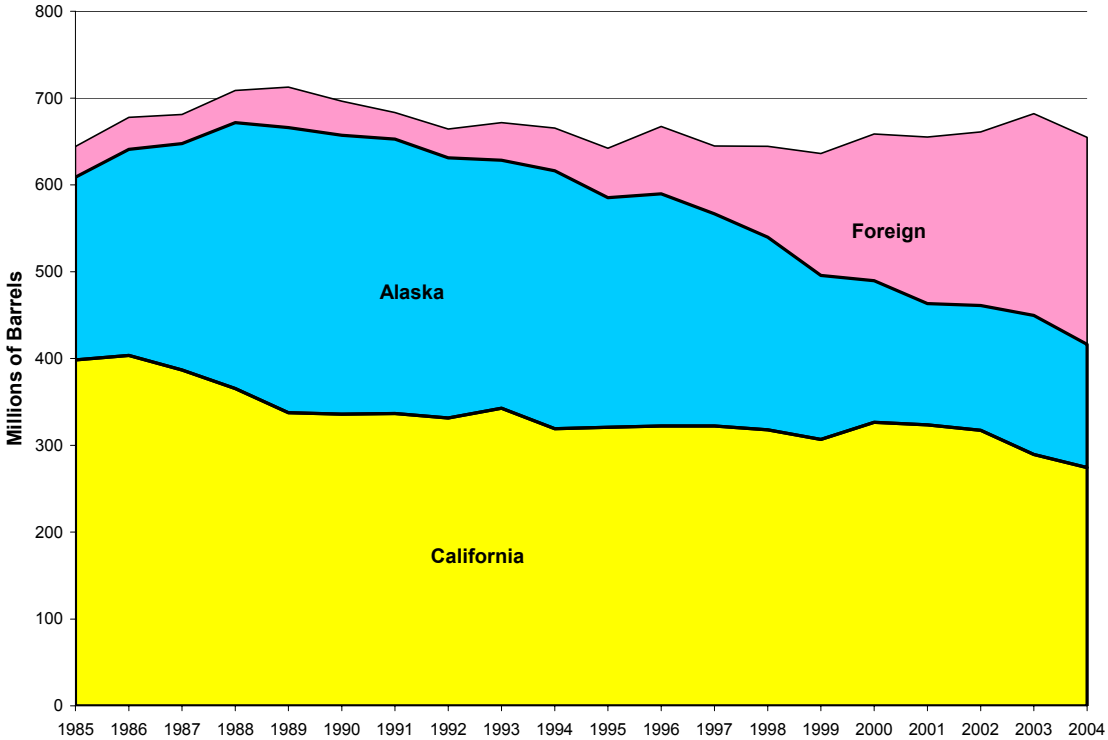
Crude Oil

California's petroleum refineries process approximately 1.8 million barrels per day of crude oil,[6] which yields around 1.4 million barrels of clean fuel products. Although sources of crude oil for individual refineries vary, California refiners overall rely to an increasing degree on imported crude oil as extraction in California has declined. In 1985, California crude oil accounted for almost two-thirds of refinery crude oil input; by 2004 the proportion had fallen to less than one-half. Over the same period, extraction of California crude oil declined from

roughly 400 million barrels annually to less then 300 million barrels, an average decline of almost 2 percent per year. Alaskan crude oil output also has begun to decline, and foreign sources of crude oil now make up over one-third of refinery input, up from less than 10 percent 20 years ago. Figure 5 illustrates crude oil receipts in California by source.

Declining California crude oil extraction along with increasing crude oil input required by refineries means that imports will continue to increase. To gauge the potential for increased imports of crude oil, the staff compared projections of California extraction and required refiner input for 2005 through 2025, using past trends. To project crude oil extraction in California, the staff assumed that the annual rate of decline would continue at 2 percent. For projected input, the staff extrapolated from 2004 onward using the average rate of growth in the capacity to distill[7] crude oil for all refiners from 1996 to 2004, around 0.3 percent per year. This historical period was selected because 1996 is the first year when California reformulated gasoline (RFG) was required for the state, the beginning of a new era for the California petroleum market. The rate of growth in capacity was used rather than that of total input because capacity is a better reflection of long term trends, while input can vary significantly depending on economic conditions and the frequency of unplanned refinery outages.

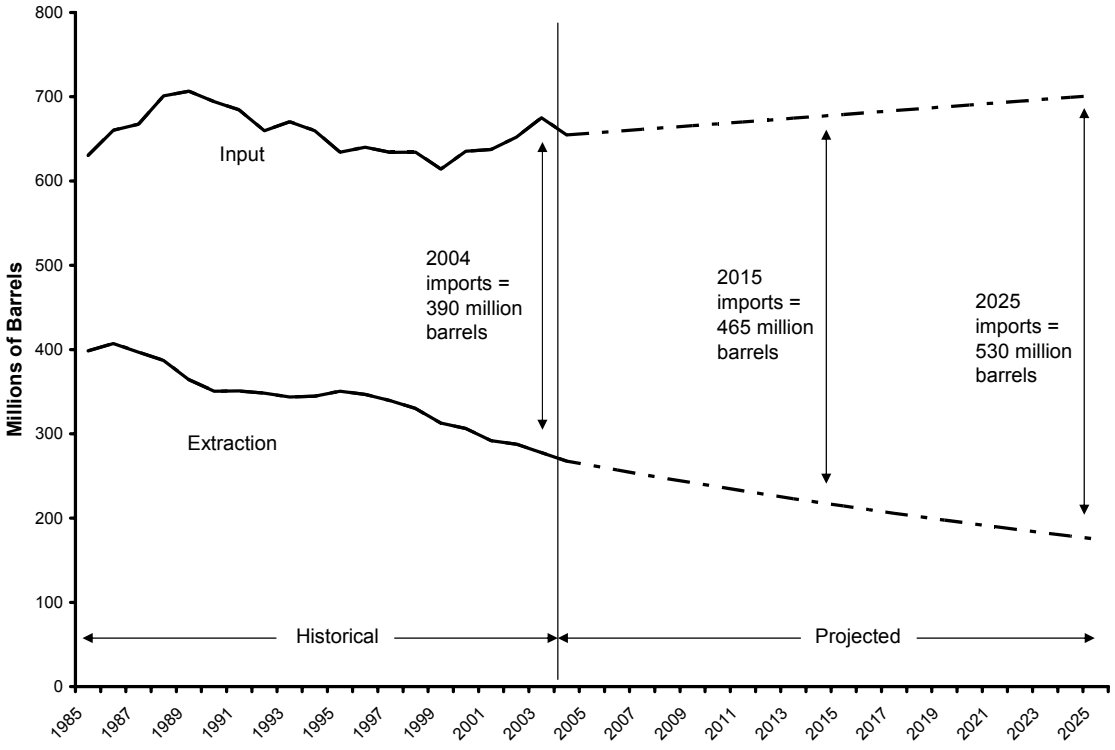
Figure 5
Crude Oil Receipts by Source for California Refineries



Source: Energy Commission *PIIRA Database*

Figure 6 shows the historical and projected totals for crude oil extraction and input; imports of crude oil are measured by the difference between the two. The trend in crude oil input before 1996 was generally downward due to refinery closures. Crude oil imports are projected to increase from 390 million barrels per year in 2004 to 465 million barrels in 2015 and to 530 million barrels by 2025. For California ports, these increases would translate roughly into an additional 150 shipments of crude oil received per year in 2015 and an additional 300 incoming shipments by 2025.[8]

Figure 6
Historical and Projected California
Crude Oil Extraction, Input, and Imports



Source for historical data: Energy Commission *PIIRA Database*

These projections are rough estimates that assume past trends will continue and that demand for petroleum products does not change drastically. However, the estimates may be conservative. If refiners continue to increase utilization rates, operating closer to total capacity, then crude oil input could grow at a faster rate than projected. In addition, crude oil extraction in California has dropped at a much faster rate in the last 5 years, around 3.5 percent, than the average over the 20-year period. Imports also could rise if distillation capacity were to increase at a higher rate than anticipated. As an example, doubling the projected growth

rate of crude oil input to 0.6 percent per year and assuming a rate of decline in extraction of 3.5 percent per year would increase imports to 515 million barrels in 2015 and 615 million barrels by 2025. On the other hand, if worldwide crude oil prices remain high, increased drilling activity in California may become economically viable, and this could mitigate the decline in crude oil extraction.

Clean Fuels: Gasoline, Diesel, and Jet Fuel

California long has been a net importer of commercial jet fuel and recently has become a net importer of combined gasoline and diesel as refinery output has not kept pace with demand. Refiners import CARB gasoline and diesel to meet California demand, as well as non-CARB gasoline and diesel to export to neighboring states. In addition, refiners import blending components used in the refining of gasoline. In 2003, imports of all products totaled over 81 million barrels.

The future rise in imports of clean fuels depends on California refinery output produced from crude oil and supplied to the state, referred to in this report as "refined supply," relative to total demand. A starting point for forecasting refined supply is the projection for the increase in distillation capacity, 0.3 percent, as previously discussed. However, refiners in recent years have increased capacity for other types of processing units[9] at a slightly higher rate than distillation capacity, so that more fuel is produced from a given amount of crude oil. To reflect this trend, the staff assumed a slightly higher growth rate, 0.5 percent per year, for refined supply of clean fuels. This growth is referred to as refinery "creep."

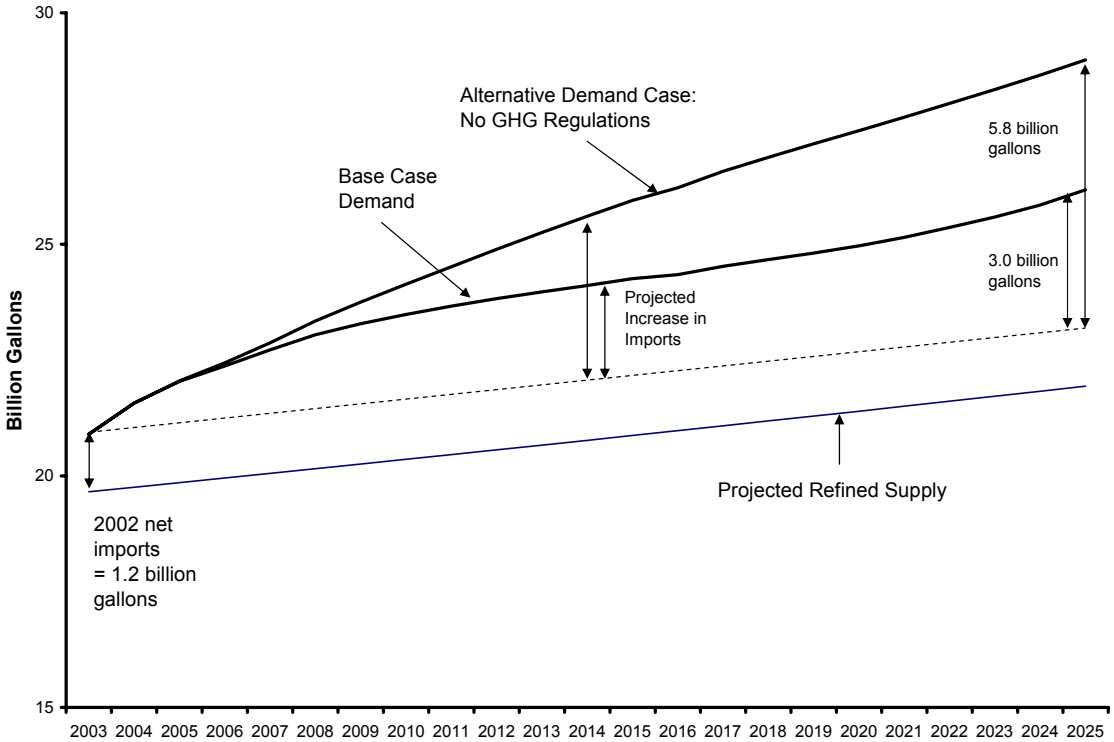
The staff forecast two scenarios for future gasoline, diesel, and jet fuel demand: a base case forecast and an alternative forecast. The base case forecast assumes the light-duty vehicle greenhouse gas regulations required under recent state legislation [Assembly Bill 1493 (Pavley), Chapter 200, Statutes of 2002] are implemented. In this scenario, restrictions on tailpipe emissions of carbon dioxide beginning in 2009 lead to a per-vehicle reduction in fuel use of about 13 percent below 2003 levels by 2015. The alternate forecast assumes that the greenhouse gas regulations are not implemented, although hybrids and light-duty diesel vehicles are assumed to become available in ever higher numbers, which increases average fuel efficiency slightly. Jet fuel demand is projected to rise more quickly than in the last few years but at a lower rate than in the 1990s. Projected jet fuel demand remains the same in each scenario. Total clean fuels demand rises by an average annual rate of around 1 percent in the first scenario, and by about 1.5 percent in the second.

Figure 7 compares projected demand under these two scenarios with projected refined supply of clean fuels. Refined supply for 2003 was calculated by subtracting net imports, 1.2 billion gallons,[10] from actual demand in 2003. Output

was projected beginning in 2004 since 2003 is the latest year for which complete import data are available. Refinery output then grows at a rate of 0.5 percent per year through 2025. Projected net imports are measured by the difference between refined supply and demand. Under the assumption that marine exports remain relatively constant,[11] the difference in net imports between 2003 and any forecast year gives the projected increases in required imports for each demand scenario. These increases are shown in Figure 7 as the difference between the dotted line and demand.[12]

In the base case forecast, imports of clean fuels increase over the 2003 level by 2.1 billion gallons in 2015 and 3.0 billion gallons in 2025. In the alternate forecast, imports increase by 3.8 billion gallons in 2015 and 5.8 billion gallons in 2025. To put these projections in some perspective, assuming an average cargo discharge of around 150,000 barrels,[13] each additional billion gallons of imports would require roughly 150 incoming shipments. Since ethanol arriving by train makes up around 6 percent of gasoline by the time it is sold in the market, these figures would overstate import requirements slightly.

Figure 7
Projected Clean Fuels Demand, Imports, and Refined Supply

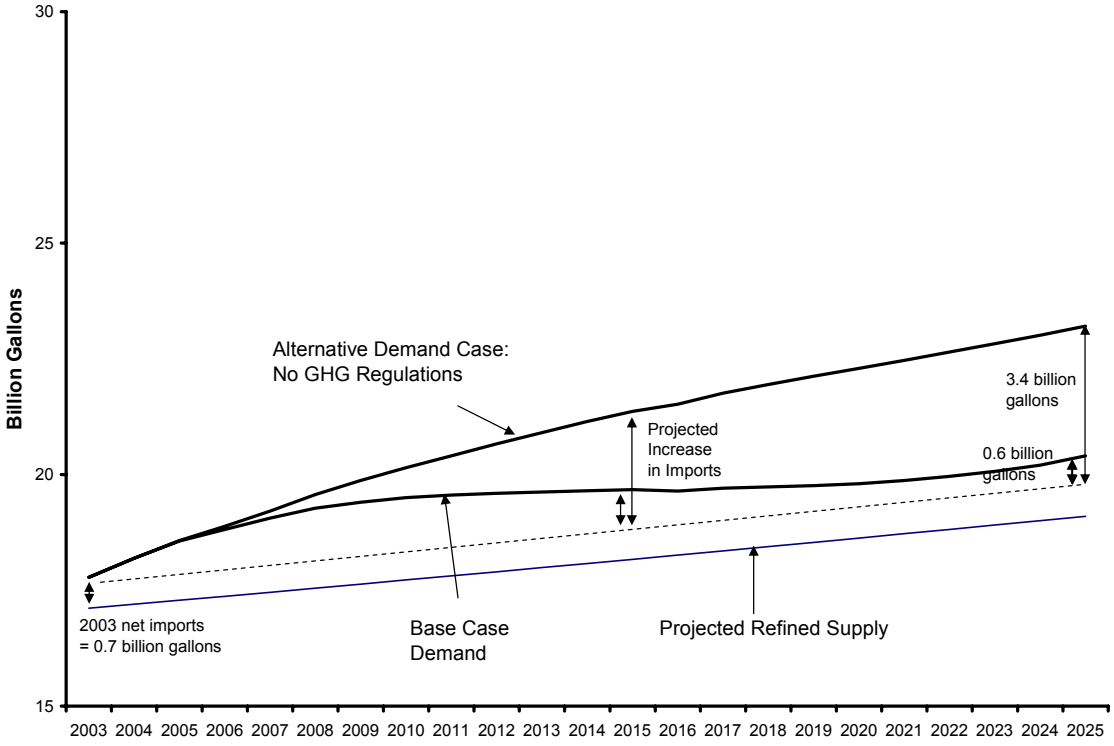


Note: Clean fuels include gasoline, jet fuel, and diesel.
Source: *Forecasts of California Transportation Energy Demand, 2005-2025*, Draft Staff Report, forthcoming.

The staff also projected imports of gasoline and diesel separately.[14] Under the same assumption for growth in refined supply,[15] 0.5 percent per year, Figure 8 shows projections for the two demand scenarios. The differences between net imports in any forecast year and net imports in 2003 (0.7 billion gallons[16]) give the projected increases in imports for each demand scenario. As in Figure 7, these projected increases are shown by the difference between the dotted line and demand.

In both the base and alternative cases, imports of gasoline and diesel are projected to increase quickly through 2010, by 1.1 billion gallons in the base case and by 1.8 billion gallons in the alternate case. After 2010, projected imports continue to increase in the alternate case, reaching 3.4 billion gallons above the 2003 level in 2025. However, the base case forecast for gasoline plus diesel flattens due to the greenhouse gas regulations, so that projected imports begin to drop. The increases in imports over the 2003 level in the base case are projected to be 0.8 billion gallons in 2015 and 0.6 billion gallons in 2025. Adjusting for ethanol added to gasoline would reduce projected import requirements by slightly less than 6 percent.[17]

Figure 8
Projected Gasoline plus Diesel Demand, Imports, and Refined Supply



Source: *Forecasts of California Transportation Energy Demand, 2005-2025*, Draft Staff Report, forthcoming.

These projections are subject to much uncertainty. If the greenhouse gas regulations are implemented and refineries expand capacity at a faster rate, or if population growth is slightly slower than assumed, then increased imports of gasoline and diesel may only be a short-term issue. In the longer term, imports of gasoline and diesel may be no higher than today's level. In fact, if refinery expansion were to reach one percent per year, imports of gasoline plus diesel would be projected to fall to zero by 2015. On the other hand, if the greenhouse gas regulations are not implemented, and if growth in demand is closer to the average over the last 20 years, around two percent, future imports could be significantly higher than projected under the alternative scenario.

Table 2 summarizes the forecast results for increases in crude oil and clean fuel imports. These projections will be used later in the report to estimate future infrastructure requirements.

Table 2
Projected Increases in Imports for 2015 and 2025

	2015	2025
Crude Oil	75 million barrels	140 million barrels
Clean Fuels: Base Case Demand	2.1 billion gallons	3.0 billion gallons
Clean Fuels: Alternative Demand Case	3.8 billion gallons	5.8 billion gallons
Gasoline and Diesel: Base Case Demand	0.8 billion gallons	0.6 billion gallons
Gasoline and Diesel: Alternative Case Demand	2.5 billion gallons	3.4 billion gallons

Residual Fuel Oil

In addition to gasoline, diesel, and jet fuel, California imports and exports residual fuel oil. However, movements of this product are harder to predict. As an example, California was a net exporter of residual fuel oil in 1999, a net importer in 2000, a net exporter in 2001, and a net importer once again in 2002 and 2003. The total amount of residual fuel oil moved, imports plus exports, actually declined every year from 2000 through 2003, from 39 million barrels in 2000 to 17 million barrels in 2003.[18] Given the lack of a clear upward trend in movements of this product, the staff did not attempt to address infrastructure requirements for residual fuel oil in this report.

Constraints to Meeting Supply Needs

The previous section focused on future demand for petroleum and petroleum products relative to supply produced in-state, giving rough estimates of import requirements. This section identifies potential constraints to future supply and imports, summarizing results of staff interviews with fuel producers, traders, and government agencies. In this report, a constraint is an element impacting the petroleum infrastructure that either reduces supply or creates additional costs associated with acquiring that supply. In either case, the result is higher prices for California consumers.

In-State Refinery Production

California's existing network of petroleum refineries is usually portrayed as producing at or near its maximum possible rate, with limited prospects for major expansions or additions. However, while plans for new ground-up petroleum refinery projects in the state are non-existent, California's refineries do have the potential to expand production of petroleum fuels above the projected refinery creep of 0.5 percent per year.

Operators of the state's refineries generally acknowledge this potential, pointing out that land and other assets are available to expand most refinery facilities well beyond the projected refinery creep. The ability to match or exceed future growth in clean fuels demand is, therefore, not out of the question.

Refiners point to regulatory and institutional factors as the primary impediments to more aggressive refinery expansion plans in the state. These factors contribute to higher costs of undertaking new projects, compared to costs in other parts of the country. With some exceptions, there appears to be a general perception among refiners that California is not a hospitable or receptive state in which to consider major expansion. In essence, corporate investments in expanded refining capacity in the state may not measure up well against other supply options available to the industry.

Product Transport

As the demand for imported petroleum and fuel products increases, the availability of suitable marine transport vessels becomes significant. Three factors could affect the state's ability to ensure sufficient access to marine transportation.

First, the world demand for tankers is increasing rapidly. High rates of growth in the world's developing countries, especially China and India, have begun to

significantly impact world petroleum demand and associated transport. Second, as vessel emissions and other environmental issues in California's ports have received increased attention, port requirements are becoming more restrictive. Limitations have been imposed on some vessels, such as older single-hull tankers. Third, U.S. regulation limits the type of vessel allowed to deliver cargo from other parts of the country. The Jones Act requires vessels transiting between U.S. ports to be U.S. constructed, flagged, and crewed. This requirement has increased costs and limited the availability of vessels that can deliver Alaskan oil or petroleum products from out-of-state refineries to California.

California petroleum marine terminal operators indicate that vessel availability is adequate to meet current needs. However, the staff recommends that the Transportation Committee continue to follow this issue.

Rail transport of fuel components, such as ethanol and liquefied petroleum gas, into and out of California is becoming a more significant part of the state's fuel supply system. Although a disruption in rail service, particularly in the case of ethanol, could have serious short-term impacts on fuel supply, the rail transport system appears to be functioning effectively.

Marine Facilities

Without a major expansion in the refinery system, adequate petroleum marine terminal access, capacity, and associated storage will become increasingly important in meeting the state's fuel supply needs. Events affecting the expansion of marine infrastructure, as well as the continued operation of some of the state's existing marine terminals, may present formidable challenges.

Both the Bay Area and the Los Angeles Basin face operational constraint issues related to marine infrastructure. The issues are, in general, different in each case, although both areas may be impacted by newly enacted standards for marine terminals.

Los Angeles Basin

Importers and exporters of petroleum and petroleum products in the Ports of Los Angeles and Long Beach increasingly confront local issues associated with land use and environmental and safety concerns. The proximity of urban development creates pressure to classify petroleum activities at these ports as "inconsistent" with area risk management plans. As a result, the trend at both ports appears to be toward other types of product movement, particularly containerized goods, and away from petroleum products.

The rapid growth in the movement of goods through the ports of Los Angeles and Long Beach has resulted in tremendous demand for land to accommodate the offloading, storage, and transfer of cargos. The scarcity of available land has required new acreage created by filling in portions of both harbors, including the addition of over 500 acres of new land referred to as Pier 400. However, most space at Pier 400 is now occupied with cargo container activity, with only enough available land for one set of petroleum infrastructure storage tanks and two berths. Given the lack of available space, it is quite possible that another Pier 400 would have to be created to accommodate additional infrastructure or existing infrastructure that may be forced to relocate.

The growth in cargo movements through the Ports of Los Angeles and Long Beach has led to greater concern over emissions.[19] Efforts to limit emissions could impact the ability of the industry to import adequate quantities of crude oil and refined products. In particular, regulation likely will be geared toward emissions from berthed marine vessels. This could have more of an impact on crude oil and refined fuel carriers than on other types of vessels since these carriers use far more power to operate the pumps used to discharge cargos.

Most of the petroleum marine terminals in southern California operate under a lease structure, subject to approval by one of the two ports. Terminal operators indicate that renewing leases for existing petroleum terminal facilities is becoming increasingly difficult and lengthy due to local pressure exerted on the ports. They also cite a lack of adequate recourse to address operational petroleum infrastructure leases that have been denied renewal by port and other authorities.

If a facility is denied lease renewal and forced to close, remaining facilities will need to be utilized at a higher rate, increasing operational costs for the industry. Even if the facility can relocate within the same area, operational costs can increase. For example, an alternative site may not have the same access to the petroleum pipeline network or may not have a marine berth with depth of water sufficient to receive the necessary vessels, requiring cargo transfer to smaller ships that can dock at the berth.

The southern California terminals are experiencing difficulties in adding any new petroleum storage capacity[20] and, in some cases, maintaining existing storage facilities. A number of petroleum storage tanks have been idled and subsequently demolished over the last several years. Some of these storage tanks were decommissioned because of changing demands for certain types of petroleum products. In other cases, however, storage tank facilities were forced to close because port authorities have not renewed the leases. This loss of storage capacity has placed additional demands on the remaining facilities and most storage facilities now operate at near capacity.

An example helps to illustrate this issue. AmeriGas operates a terminal and storage facility at the Port of Los Angeles and stores butane produced by two nearby refineries. Amerigas' lease for the connecting pipelines is up for renewal with the port, but is facing considerable local community opposition. The port has not yet made a decision on the renewal. If the lease is not renewed, AmeriGas either would be forced to move its facilities or seek other more costly options to move butane from the storage facility.

Occupancy rates at marine berths are at or approaching 50 percent at some petroleum terminals, which is close to a practical maximum because costs associated with delays rise very quickly when occupancy is above this level. However, most terminals currently operate below this level and therefore have some spare capacity.[21]

The jet fuel infrastructure in the Los Angeles Basin is mainly in the hands of a consortium of airlines. Jet fuel storage is available at the airport and in the Port of Los Angeles. Tank space is adequate, although storage frequently operates at near capacity.

Bay Area

Unlike southern California, the San Francisco Bay petroleum marine terminals do not face direct competition with other types of cargo handling, which take place at separate locations. In addition, marine terminals in the Bay Area generally operate on proprietary leases that are not subject to oversight by any port authority. In general, San Francisco Bay area terminals have more potential for expansion than those in the Los Angeles Basin and fewer problems related to continued operation. Further, berth occupancy rates for these terminals are on average slightly lower than in the south.

However, the San Francisco Bay terminals face significant limitations because of the relatively shallow depths of the Bay's shipping channels. The depth that a vessel sits in the water, or draft, is limited to 50 feet for ships entering the San Francisco Bay, while modern Very Large Crude Carriers have drafts of over 60 feet. The dredged depths of some of the Bay's shipping channels and/or water depths at some of the Bay's petroleum marine terminals sometimes impose even shallower vessel draft restrictions. More shipments by smaller size vessels must therefore be employed. Furthermore, maintaining depths near marine terminals adequate for the docking of tankers that are allowed in the Bay is a continuing problem.

The common practice of transferring tanker cargo to smaller vessels employed in San Francisco Bay because of draft restrictions is known as "lightering." Vessels that cannot directly access petroleum marine terminals due to constrained channels, such as the Pinole Shoal, divert to and anchor in a designated

lightering zone in South San Francisco Bay. Cargos are then transferred to barges or smaller vessels that can navigate the constrained channels and access berths at the marine terminals. Lightering, subject to strict U.S. Coast Guard regulations, incurs additional costs, inefficiencies, and time delays that would be avoided if channel depths allowed direct access to marine terminals. An additional oil spill risk is also created.

Timely and reliable dredging of the Pinole Shoal to support marine movements into the Carquinez Straits is proving to be a major challenge, due mainly to lack of federal funding.[22] In addition, environmental concerns limit the period of time that dredging activity can occur and the locations where dredging spoils can be deposited. These factors do not prevent the delivery of petroleum products but lead to higher costs for transporting petroleum products.

Most marine terminals in the San Francisco Bay area also require periodic maintenance dredging to offset the siltation process common to its waterway system. Logistical and permitting obstacles sometimes impede this maintenance, adding to the difficulties terminal operators face.[23]

As in the Los Angeles Basin, the jet fuel infrastructure in the Bay Area appears to be generally adequate in the short term. Fuel storage, while operating close to capacity in some periods, is sufficient. Most jet fuel is produced by local refineries, so that delivery is not impacted to the same degree by the shallow waters of the Bay.

New Standards for Marine Terminals

All petroleum marine terminals in California are subject to a new set of state regulations, known as the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), approved by the State Lands Commission (SLC) in 2004 and adopted by the Building Standards Commission in January 2005. MOTEMS is a comprehensive standard for the design, construction, maintenance, inspection, and repair of petroleum marine terminals. The SLC characterizes these standards as representing the “best current practice of industry” in order to meet "the best achievable protection of public health and safety and the environment."[24] The primary purpose of MOTEMS is to prevent crude oil and petroleum product spills.

Some of California’s marine terminal network, especially in southern California, will need significant upgrades to meet these standards. These upgrades are likely to require costly investments and could cause operational disruptions. It is possible that some companies may choose to close terminals rather than rehabilitate them to the new standards.

In a preliminary survey of the state's marine terminals, the SLC provides an indication of their condition (either "good," "fair," or "poor") with respect to the MOTEMS standards. It appears that the major impact of MOTEMS will be on marine terminals equipped to receive clean fuels in southern California. Based on 2004 throughput, 20 percent of the terminal capacity in the Ports of Los Angeles and Long Beach is rated as poor, and another 20 percent is rated as fair. In contrast, over 90 percent of Bay Area clean fuel terminal capacity is rated as good and the remainder as fair. California crude oil terminals appear to be in better shape overall than clean fuels terminals: less than one percent of crude oil terminal capacity has been designated as poor.

The MOTEMS regulations include considerable compliance flexibility and an implementation schedule based upon the spill risk associated with each terminal.[25] Negotiated lead times are provided for analysis and rehabilitation of individual terminals. Therefore, it is possible that compliance can be achieved without major supply disruptions or fuel price impacts. Further, the SLC believes that marine terminal capacity may be at least 20 percent higher than actual throughput and that therefore closing some facilities might not impact product movement.[26] The staff recommends close monitoring of the impacts of these standards.

Pipelines and Distribution Terminals

The California pipeline system is generally of advanced age, with most pipeline sections built in the 1950s and 1960s. There is a perception, therefore, of an increased risk of product releases and resulting supply disruptions. However, of the five significant releases in the last 18 months, only one was related to pipeline age. This leak was created by corrosion in the clean fuels pipeline that runs from Concord to Sacramento. Kinder Morgan had already initiated a project to replace this section of pipeline but experienced delays in the permit process. Without these delays, the new line might have been completed prior to the leak occurring.

Over the next 20 years, new pipeline projects will probably be undertaken to replace or expand specific segments of the petroleum pipeline infrastructure, but not necessarily because the pipelines are getting older. Advances in cathodic protection, pipeline coatings, inspection techniques, and preventative maintenance should reduce the risk of leaks in existing pipelines. However, not all corrosion can be prevented, so a small percentage of pipeline mileage will likely need to be replaced on a continuing basis.

Since crude oil pipelines have excess capacity, shipment delays are rare.[27] However, certain portions of California's clean fuels pipeline network, particularly the gathering lines that deliver clean fuels from refineries and marine facilities to the main Kinder Morgan lines, operate at close to maximum capacity, especially

during the summer. During congested periods, truck transport is often employed to supplement pipeline deliveries; in the San Francisco Bay, barges are occasionally used to transport product from one marine terminal to another to avoid congested lines. Jet fuel delivery is affected by these restrictions in the Bay Area, but in the south much of the fuel is delivered directly to Los Angeles International Airport through pipelines from the Port of Los Angeles, avoiding local congestion.

The state's fuel distribution terminals do not face major constraints. Most terminals in the state recently completed the necessary modifications and expansions, at a total cost of around $700 million, to make the transition from MTBE to ethanol. The transition involved adding rail facilities to deliver ethanol,[28] increasing dedicated storage for ethanol, and adding equipment to dispense ethanol into fuel trucks. All of the required modifications and expansions appear to have been completed.

Petroleum Infrastructure Permitting

In the *2003 Integrated Energy Policy Report*, the Energy Commission concluded that "a major barrier to expanding petroleum infrastructure is the difficulty in acquiring construction permits from multiple local, state, and federal authorities." The Energy Commission went on to recommend in the report that "the state establish a one-stop licensing process for petroleum infrastructure, including refineries, import and storage facilities, and pipelines that would expedite permits to increase supplies of transportation energy products available to California while maintaining environmental quality." The California Performance Review also proposed a one-stop public permitting proposal for petroleum infrastructure projects.

The Energy Commission conducted workshops in June 2004 and January and February 2005 to take comments on its proposed one-stop state licensing process for petroleum infrastructure facilities and to gather information on the "best permitting practices" currently used by local and state agencies in their permitting of such facilities. During those workshops, most representatives from the petroleum industry and local and state governments, as well as local community groups, spoke in opposition to a state licensing program. The primary concerns they raised were the loss of local control of decision-making and the opportunity for public participation, the loss of legal appeals allowed under current permitting procedures, and the increased regulatory burden placed on industry. They recommended, instead, that the Energy Commission work with industry and agency representatives and members of the public to conduct a comprehensive review of "best permitting practices" currently in use and to develop "best permitting practices guidelines" for use by local and state agencies to promote the streamlining and coordination of petroleum infrastructure permitting. They also recommended that the Commission provide permitting

agencies with more information on the state's need for petroleum infrastructure expansion to help inform their decision making process. More details are provided in an appendix to this report.

Market Access

In a fully competitive market for fuel imports, traders not affiliated with the major refiners need to have access to the state's marine infrastructure. Although independent traders provide a relatively small portion of the state's total fuel supply, they play an important role in the clean fuels markets, reacting to price signals and providing a "check" on prices. If fuel prices remain high for a sustained period, independent traders, seeing a profitable opportunity, will bring in additional supply; this in turn puts downward pressure on prices.

In particular, independent traders can play a key role during a refinery outage. As fuel prices rise as a result of the supply disruption, the refiners not suffering an outage benefit from the higher prices. While these refiners may benefit from importing and selling additional supply, they are less motivated to do so than independent traders, since additional supply brings down the price for all refiner output. The traders, on the other hand, have the incentive to provide additional supply as quickly as possible, whether through bringing in a cargo or from withdrawing product already available in storage.

To bring clean product into the California market, an independent trader must acquire a shipment of fuel from outside the state, secure a ship through a broker, offload the cargo into temporary storage in a California port, and transport the product from the storage tanks into the pipeline system. If the trader has sold the cargo to a refiner with storage and feeder pipeline facilities, moving the product through the port presents few problems. However, it is the ability of a trader to sell directly into the market, obtaining storage and access to pipelines, that provides the price benefits of competition.

During staff discussions with several independent traders, all insisted that access to the California import market for gasoline and diesel was limited, particularly in the Los Angeles Basin, due to a lack of available facilities required to offload cargos, especially marine storage. The traders pointed to refiner control of the bulk of marine facilities as the underlying reason for access limitations.[29]

Although the traders all acknowledged that the marine storage situation is improving slightly, they believe that bringing a cargo in to California ports remains risky if the trader does not already control some storage. This risk reduces the number of traders willing to take a chance in the California market. In particular, some of the traders mentioned the lack of availability of "spot" tankage, storage available for short-term leases of three to six months. One trader mentioned that with more connected storage available, independents would hold a greater

amount of speculative inventory, releasing product when fuel prices rise, to the benefit of consumers. Two of the traders compared the situation in California with that in New York Harbor, where greater access to marine facilities attracts many more independent participants.

Independent traders can also face barriers in addition to lack of marine infrastructure access. As discussed in the next section, Chemoil recently converted some storage tanks in its Carson facility to handle clean fuels, and this storage will be available to independent traders. However, Chemoil has not been able to gain direct access into the main pipeline system, access controlled by Kinder Morgan, who is also a competitor in the storage industry. Until this situation is resolved, most independent traders are not willing to commit to leasing Chemoil's tanks.

Some independent traders are well established in California, with control of marine facilities, which ensures some level of competition with the major refiners in the fuel import market. A greater degree of direct access for occasional and new market participants, and therefore more import activity during a supply disruption, would require more third party (non-refiner) controlled storage facilities, with spot tankage available. However, a tight storage market in the state means that these traders must be willing to commit to a long-term lease, which many occasional traders are unwilling to do.

New Infrastructure Expansion Projects

Ongoing or planned activities to expand the state's petroleum infrastructure can be broken down into three categories: refinery expansion, marine infrastructure expansion, and pipeline expansion.

Refinery Expansion Projects

Paramount Petroleum Refinery Production

Paramount Petroleum owns and operates a refinery in southern California that has primarily produced military fuels and asphalt. In June 2004, the company received a permit to install additional refinery equipment to enable the facility to produce CARB gasoline and diesel. The work is scheduled to be completed in mid-2005 and could contribute an additional 7,500 barrels per day of gasoline and 8,700 barrels per day of diesel.

Continued Operation and Possible Expansion of the Shell Refinery

The former Shell refinery in Bakersfield has been sold to Big West, LLC, a subsidiary of Flying J, Incorporated. The transfer of ownership was completed in March 2005.

This refinery supplies the equivalent of two percent of the state's gasoline production and six percent of its diesel production. If this refinery would have closed, immediate constraints for the northern California and Central Valley pipeline and distribution infrastructure would have been created. Closure would have also resulted in more imports of refined products, in the range of an additional 30,000 to 40,000 barrels per day combined totals for gasoline and diesel.

Big West is considering an expansion project at the refinery to increase gasoline and diesel production by another 10,000 to 12,000 barrels per day by installing a fluid catalytic cracker process unit and an alkylation plant. If undertaken, the project will likely take between 24 and 48 months to complete.

Marine Infrastructure Projects

Pacific Energy Partners – Crude Oil Marine Terminal

In anticipation of increased shipments into the region, the Port of Los Angeles initiated an ambitious expansion project in the mid-1990s that dredged channels and built land on a site known as Pier 400. Much of the land was initially intended for petroleum-related marine infrastructure but was diverted to projects for the rapidly expanding container traffic. However, some space on Pier 400 was reserved for a petroleum offloading facility.[30] Pacific Energy Partners has proposed a crude oil marine terminal on this site that is presently in its advanced planning and permitting stages.

Pier 400 is a facility with many advantages. The water depth is 81 feet, the deepest of any U.S. port except the Louisiana Offshore Oil Port. Vessel approach is virtually unrestricted, enabling Very Large Crude Carriers to access the wharf without entering the congested inner harbor. The right-of-way for a large 42-inch diameter pipeline was also reserved by the Port of Los Angeles to transport oil to central tanks and then to refineries.

The Pacific Energy Partners project is designed to handle up to 250,000 barrels per day of imported crude oil and will maintain up to 4,000,000 barrels of storage.[31] The company expects initial volumes to start at 150,000 to 180,000 barrels per day. One refiner has committed to a long-term contract to receive

crude oil from the facility, and negotiations are underway for long-term contracts with several other refiners.

The project is well into the permitting process, with the environmental review public scoping meetings beginning in July 2004. Air quality permitting is the greatest regulatory challenge, and the company has begun to purchase emission reduction credits to offset additional expected vessel emissions. Pacific Energy expects final approval of the environmental impact report in September 2005. Assuming these timelines are met, construction is anticipated to be completed and the facility operating by March 2007.

Chemoil Terminal Conversion

Chemoil has provided storage services for the bunker fuel consumed by larger marine vessels in Long Beach Harbor. The company recently modified around 500,000 barrels of its fuel storage tanks to accommodate cleaner products such as gasoline and blending components. Chemoil has also constructed a new pipeline for delivery of clean products from their marine terminal to their Carson facility, and work on converting the terminal to receive these products has also begun. The terminal now includes one portside clean fuels storage tank.

Unlike companies that dispense bunker fuels, however, importers of gasoline and blending components require access to the Kinder Morgan pipeline system. Chemoil has been unsuccessful so far in accessing directly the nearby Kinder Morgan terminal and has had to move its product into the system through a terminal owned by BP. If Chemoil can tie in directly to the main pipeline system, it may convert another 500,000 barrels of storage.

Kaneb – Martinez Storage Tank Additions

Kaneb Services is expanding its terminal operations in Martinez, building several new tanks for clean fuels that will amount to 400,000 barrels of new storage capacity. This project has several advantages that have facilitated its development. The company has inherited an approved environmental impact report and related permits from Shore Terminals obtained prior to its acquisition by Kaneb. Also, the facility has sufficient land available for this expansion, no conflicting adjacent land uses, and is well situated with respect to access to the Kinder Morgan pipeline system.

Permit approvals allow two million barrels of storage. This means that with 300,000 barrels of storage already built and 400,000 barrels under construction, an additional 1.3 million barrels of tankage could be constructed without new permitting required.

Kinder Morgan Carson Terminal Storage Tank Project

Kinder Morgan has begun expanding storage capacity and related equipment at its Carson terminal, obtaining the required city permits and approvals in early 2005. When complete, the project would add 18 new 80,000 barrel product storage tanks and one new 30,000 barrel transmix[32] storage tank.[33] The new tanks would be capable of storing finished gasoline, diesel, and jet fuel, as well as blendstocks. In addition, Kinder Morgan plans to increase throughput capacity at this terminal from 10,000 barrels to 15,000 barrels per hour, with the potential for future increases to 20,000 barrels[34]. All but one of the refineries in the Los Angeles region are currently connected to the terminal.

The first stage of the storage expansion would add 10 new tanks: 4 that are under construction and 6 more to be completed in 2006. In the second stage, eight more tanks will be added, assuming prospective tenants are willing to commit to a lease.

Pipeline Expansion

Kinder Morgan Pacific North Line Expansion

In December 2004, Kinder Morgan replaced its 14-inch diameter common carrier pipeline between Concord and Sacramento with a new 20-inch pipeline. About 70 miles long, this pipeline transports gasoline, diesel, and jet fuel from the Bay Area to terminals in northern California. The expansion improves throughput capacity on the line to 175,000 barrels per day, an increase of around 15 percent. With additional improvements to pumping capability, capacity on this line could potentially increase to 200,000 barrels per day[35].

Kinder Morgan Pacific East Line Expansion

Kinder Morgan is planning to expand the segments of their Pacific East Line from El Paso to Tucson and from Tucson to Phoenix. They have already completed the interconnection with the Longhorn Pipeline from Houston to El Paso as well as a 12-mile section through Tucson. The expansion of the East Line section to Tucson would increase the capacity of that line by 56 percent, while expanding the pipeline between Tucson and Phoenix would increase capacity to Phoenix by 80 percent.[36] Kinder Morgan is currently seeking environmental and other permits and rights-of-way. The remainder of the project is tentatively scheduled to begin in the third quarter of 2005, with completion anticipated in the first quarter of 2006.[37]

Expansion of the Pacific East Line benefits the California fuels market. Refiners and importers in California have historically transported substantial amounts of petroleum products by pipeline to Arizona. This expansion would lessen the impact of Arizona's rapid growth on California supply, as Gulf Coast products begin to reach Arizona in greater volume.

Future Infrastructure Requirements

Although the state's marine infrastructure has some spare capacity, and can usually handle temporary surges in import volumes, sustained increases will at some point require importers to expand existing facilities or to build new ones. Similarly, increased imports combined with additional refinery production will, in the long term, require expansion of the pipeline system. This report provides an assessment of future infrastructure requirements by combining projections of imports,[38] potential constraints, and the impact of recent infrastructure expansion.

Table 3 gives projected increases in annual imports in the Bay Area and the Los Angeles Basin for 2015 and 2025. For this regional breakout, the staff used the state projections given in Table 2 and assumed that the Los Angeles Basin will continue to import roughly 60 percent of crude oil and 80 percent of clean fuels into the state, with the remainder delivered to the Bay Area.[39]

Crude Oil

California's petroleum marine terminals for crude oil and clean fuels as a whole appear to have some excess capacity, relative to maximum practical berth occupancy rates. As discussed previously, the State Lands Commission believes practical capacity is at least 20 percent higher than actual throughput, a claim based on interviews with refiners.

Table 3
Projected Increases in Imports for 2015 and 2025, by Region

	2015		2025	
	Bay Area	L.A. Basin	Bay Area	L.A. Basin
Crude Oil	30 million barrels	45 million barrels	56 million barrels	84 million barrels
Clean Fuels: Base Case Demand	0.4 billion gallons	1.7 billion gallons	0.6 billion gallons	2.4 billion gallons
Clean Fuels: Alternative Demand Case	0.8 billion gallons	3.1 billion gallons	1.2 billion gallons	4.6 billion gallons

Note: the sum of Bay Area and L.A. Basin projections may not match the totals in Table 2 due to rounding error.

The State Lands Commission estimate does not seem unreasonable. A 2003 study for the Energy Commission[40] estimated a mean occupancy rate for refiner berths in the Bay Area of around 40 percent. In the Los Angeles Basin, the study found that over 80 percent of crude oil and petroleum fuels imports were handled at berths operating below maximum practical occupancy rates, in a range between 20 percent and 50 percent. Although not estimated directly in this study, berth occupancy rates calculated in the study for the Los Angeles Basin also correspond to an overall average of about 40 percent. With a maximum practical berth rate of 50 percent, this translates to an average excess capacity of 20 percent for both regions. The staff assumed 20 percent currently available marine terminal capacity for the Bay Area and the Los Angeles Basin in the estimates of future infrastructure requirements given below, both for crude oil and clean fuels.[41]

The estimates for additional terminal capacity given below, both for crude oil and clean fuels, should be considered minimum requirements. Marine terminal owners make decisions based in part on flow during peak periods, when berth occupancy rates can reach 50 percent or higher. Thus, terminal expansion may be undertaken at a point when average occupancy rates over the course of a year are still below 50 percent. In addition, some clean fuels are imported into California for delivery to Arizona and Nevada. Increasing demand for clean fuels in these states will place additional demands on California's marine terminals.

Assuming that the Los Angeles Basin continues to receive around 60 percent of the state's imports of crude oil, the capability to receive crude oil in this region appears to be sufficient through 2025. If the Pacific Energy Partners crude oil terminal and associated tankage is up and running in 2007 and can handle 250,000 barrels per day, import throughput in the Los Angeles Basin will be able to keep up with increasing demand. This outlook assumes that existing infrastructure assets are not diminished over the next several years. Crude oil facilities seem to be in good shape with respect to MOTEMS, but new operational restrictions imposed by state or port authorities, or continued local pressure, could remove some existing facilities.

Increased reliance on foreign crude oil by California's refineries will require a greater percentage of crude oil shipments in Very Large Crude Carriers.[42] While not a problem in the south, especially with the construction of the new crude oil terminal, this will exacerbate the difficulties associated with crude oil delivery in the San Francisco Bay due to shallow waters. A larger average shipment size will also require more temporary storage capacity in the Bay Area. In addition, assuming the region continues to receive about 40 percent of crude oil imports, and assuming 20 percent current excess capacity, the Bay Area will likely need additional crude oil marine terminal capacity and accompanying storage equivalent to one average sized facility (import throughput of around 20 million barrels per year) by 2025.

Clean Fuels

The amount of expansion required in the clean fuels marine infrastructure depends on how many current assets are lost. Continued pressure for removal of petroleum facilities in the Los Angeles Basin and the requirements of the MOTEMS standards or some new regulation could diminish existing infrastructure significantly.

Assuming no loss in existing facilities and 20 percent current excess capacity for marine terminals, estimates of the amount of terminal capacity expansion required for clean fuels imports by 2015 and 2025 are given in Table 4.[43] To put these numbers into perspective, the largest marine terminals in the state handle around 50 million barrels per year of clean fuels and the average facility around 5 million barrels per year. Thus, for example, under the base case scenario the Bay Area would require slightly more than one additional average sized terminal or equivalent expansion in existing facilities by 2015. Under the alternative demand scenario, the Los Angeles Basin would require two very large terminals or equivalent expansion in existing facilities by 2025.

Table 4
Estimates of Additional Marine Terminal Capacity (in Barrels) Required for Imports of Clean Fuels

Year	Scenario	Total Projected Additional Capacity Required	Projected Additional Capacity Required for Bay Area	Projected Additional Capacity Required for L.A. Basin
2015	Base Case Forecast	37 million	7 million	30 million
	Alternative Forecast	77 million	15 million	62 million
2025	Base Case Forecast	57 million	11 million	46 million
	Alternative Forecast	124 million	25 million	99 million

Unlike marine terminals, storage facilities connected to the terminals are operating at near capacity; lack of available tankage is the most serious potential constraint in the state's marine infrastructure. Assuming current rates of tank utilization, an additional one billion gallons of clean fuels imports would require roughly two million barrels of storage.[44] Table 5 provides estimates of total new

tankage required for 2015 and 2025 under the two demand forecasts, not including storage planned or under construction.

As previously discussed, around 400,000 barrels of clean fuels storage are under construction in the Bay Area, with permit approval for an additional 1.3 million barrels. If all 1.7 million barrels of storage are built, enough additional capacity should be available to meet requirements under the base case scenario for the next 20 years. In the alternative demand case, requirements would be met through 2015, but by 2025 an additional 700,000 barrels of storage would be required.

Table 5
Estimates of Additional Required Storage (in Barrels) for Imports of Clean Fuels

Year	Scenario	Total Projected Additional Storage Required	Projected Additional Storage Required for Bay Area	Projected Additional Storage Required for L.A. Basin
2015	Base Case Forecast	4.2 million	0.8 million	3.4 million
	Alternative Forecast	7.6 million	1.6 million	6.0 million
2025	Base Case Forecast	6.0 million	1.2 million	4.8 million
	Alternative Forecast	11.6 million	2.4 million	9.3 million

In the Los Angeles Basin, 800,000 barrels of storage are under construction, with the potential for an additional 1.2 million barrels.[45] Even if all 2 million barrels of storage are built, the Los Angeles Basin will require additional marine storage by 2015 under either demand scenario: another 1.4 million barrels in the base case and 4.0 million barrels in the alternative case. By 2025, additional requirements reach 2.8 million barrels in the base case and 7.3 million barrels in the alternative case.

The estimates in Table 5 should be considered minimum requirements. To the extent that some current storage expansion projects are intended for strategic purposes rather than for normal receipt and distribution of clean fuels imports, the amount of additional storage required would be greater. In addition, the Kaneb facility in the Bay Area may not be the ideal location for cost-effective storage for some of the local refiners located in other parts of the Bay. If this is the case, additional expansion may be required elsewhere in the Bay Area.

The industry will continue working around congestion in the gathering pipelines from the refineries and marine facilities to the main pipeline system in the near term, using trucking and other means. In the longer term, within the 20 year forecast period, the marginal costs of these "workarounds" will likely rise to the point that industry will begin expanding capacity in these lines.[46]

If Kinder Morgan is able to expand the Pacific East Line to Phoenix, this will allow California refiners the potential to provide additional clean fuel supply within California, as long as suppliers in Houston increase clean fuel shipments to Arizona. Assuming that Houston suppliers increase these shipments at a rate corresponding to the increase in pipeline capacity, around 700 million gallons of clean fuels exports per year to Arizona from California would no longer be needed. Thus, annual California clean fuels supply produced by in-state refiners could potentially increase by 700 million gallons, reducing import requirements by the same amount.

Whether exports to Arizona decrease by an amount close to 700 million gallons or by some smaller fraction is extremely difficult to predict. Decisions made by Gulf Coast refiners depend on events in a complex world market, and it is possible that conditions may be such that these refiners do not find it economic to increase shipments to Arizona by more than a small amount. A more complete analysis of the impact of the Arizona expansion is beyond the scope of this report.

There is also the possibility that a new refinery will begin operations in Arizona within the next 10 years. Arizona Clean Fuels Yuma LLC has proposed to build a refinery that can produce up to 150,000 barrels per day of combined gasoline, diesel, and jet fuel for the Arizona market.[47] The company has already obtained the required state and federal air permits and is currently seeking financing and a source of crude oil. If the refinery is built, the likelihood of a significant decline in exports of clean fuels from California to Arizona would increase substantially.

Simulation of an Increase in Imports

The Energy Commission has sponsored the development of a simulation model to examine economic issues related to the California petroleum fuels market, the Petroleum Infrastructure and Market Simulation model (PIMSIM). PIMSIM uses a general equilibrium approach to simulate gasoline production, inventory, and import decisions in the market, within a realistic representation of California's petroleum infrastructure, including refineries, marine terminals and storage, and pipelines. Work began on the model in late 2004, and a working version is now available.

The model developers simulated the impacts of a large increase in gasoline imports to determine resulting infrastructure expansion needs. To generate

additional imports, the scenario included an increase in gasoline demand of 20 percent over 2004 levels with no increase in refinery capacity, requiring roughly three billion more gallons of clean fuels imports to be delivered to the market. The appropriate infrastructure was expanded so that significant changes in gasoline prices were not required.

Consistent with the staff's analysis, additional marine storage was required at all 11 refineries in the state with docks available, at least 300,000 barrels of additional space in each storage facility. In addition, expansion was required in the gathering pipelines from the refineries and marine facilities to the main pipeline system in both the north and south, although the model does not yet include options such as trucking to get around the gathering system during periods of high use. Finally, the main pipelines needed expansion, but at a much lower level than in the gathering lines. This last result is subject to more uncertainty since the exact capacity of the current pipelines is not known, except in cases where the capacity of certain segments is released to the press. In addition, the potential expansion of the Pacific East Line is not incorporated into the model.

Endnotes

[1] Page 36.
[2] *Forecasts of California Transportation Energy Demand, 2005-2025*, Draft Staff Report, forthcoming.
[3] Used as inputs in the chemical and plastics industries.
[4] This convention comes from the petroleum industry, which refers to pipelines that carry gasoline, diesel, and jet fuel as "clean fuels" pipelines.
[5] Common carrier pipelines are owned and operated by entities that do not own the product shipped via their pipelines.
[6] Historical data used in this section comes from the Energy Commission's *Petroleum Industry Information Reporting Act Database*.
[7] Crude oil distillation is the process whereby a refinery separates crude oil into its main components, which include light gases, naphtha, gasoline, kerosene, diesel, residual fuel oils, and residue.
[8] Assumes an average cargo discharge of 500,000 barrels, which was estimated from 2002 State Lands Commission data. Actual numbers of ships arriving in the ports would be lower since full cargos are often distributed to more than one location. To the extent that foreign crude continues to rise as a share of imports, these shipment projections may be overstated. Foreign shipments typically employ larger vessels and therefore bring larger cargos.
[9] Other processing units include fluid crackers, catalytic reformers, and alkylation units.
[10] Calculated from Energy Commission *Waterborne Commerce Database* for 2003.
[11] This does not seem to be an unrealistic assumption, since an export trend is not clear. Exports of combined gasoline, diesel, and jet fuel declined from 1996 to 1999, increased from 1999 to 2001, and declined again in 2002 and 2003.
[12] Import projections do not include imports headed to Arizona or Nevada.
[13] Estimated from 2002 State Lands Commission data for gasoline and jet fuel cargo discharges in California.
[14] The Energy Commission forecasts demand for gasoline, diesel, and jet fuel separately, using three different forecasting models.
[15] This also assumes that refineries do not change significantly the relative amounts of each fuel produced from crude oil.
[16] Calculated from Energy Commission's *Waterborne Commerce Database*.
[17] Less than 6 percent since ethanol is added to gasoline but not diesel.
[18] Calculated from Energy Commission's *Waterborne Commerce Database.*
[19] Issues related to growth in California port movements, including emissions, are discussed in *Goods Movement Action Plan—Phase I: Foundations*, prepared by the California Environmental Protection Agency and the Business, Transportation, and Housing Agency, available in draft form, [http://www.arb.ca.gov/gmp/docs/draftreport031805.pdf].
[20] In the most recent example, the Los Angeles Board of Referred Powers denied in April 2005 an application for a proposed project to construct around 2 million barrels of clean fuel storage and 4 million barrels of crude oil storage in the Port of Los Angeles.
[21] In a 2003 report for the Energy Commission, *California Marine Petroleum Infrastructure Draft Consultant Report* Stillwater Associates reported that more than 80 percent of import volumes in the Los Angeles Basin are handled through berths operating in the 20 to 50 percent range for occupancy; in the Bay Area, the overall average occupancy rate was estimated at around 40 percent. [http://www.energy.ca.gov/strategic_reserve/documents/2003-04-21_600-03-008D.PDF]
[22] The U.S. Army Corps of Engineers and the San Francisco Bay Conservation and Development Commission are the two agencies that oversee and approve dredging activity in the San Francisco Bay.
[23] Maintenance dredging is much less of a concern in the Los Angeles Basin since marine berths are not located in an active estuarine system.
[24] From *Notice of Proposed Rulemaking* by the California State Lands Commission, *Marine Oil Terminals*, Chapter 31f, May 2004.

[25] MOTEMS requires that terminals complete an initial audit to determine the current state of the facility. MOTEMS rates terminals on their risk potential for spilling oil largely based upon information provided in their oil spill contingency plans. Depending on the number of barrels of oil that could be spilled (as defined by various factors), a terminal will be designated "high," "medium," or "low" risk. These risk rating are used to determine when the required audit must be completed: 30 months after the regulations become effective for high risk terminals, 48 months for medium risk terminals, and 60 months for low risk terminals.
[26] In *Final Statement of Reasons for Proposed Building Standards of the California State Lands Commission*, September 2004, [http://www.slc.ca.gov/Division_Pages/MFD/MOTEMS/FINAL%20STAEMENT%20OF%20REASONS%20FOR%20MOTEMS.pdf]. The State Lands Commission believes that the current constraint is not marine terminal capacity, but storage connected to marine terminals.
[27] However, a recent event showed the vulnerability of a portion of the state's crude oil pipelines. A segment supplying Southern California refineries with crude oil from the San Joaquin Valley traverses very remote areas in the San Gabriel mountains. In March, 2005 the pipeline ruptured after a landslide and had to be shut down. The site of the landslide, near Pyramid Lake, will require the construction of access roads to repair the line.
[28] Most ethanol used in California is transported by rail from Midwestern states.
[29] Estimates by the traders of the percentage of California marine storage facilities controlled by refiners were consistent: all said 90 percent or higher.
[30] See pp 117-119 of the transcript of the July 11, 2003 workshop for the *2003 Integrated Energy Policy Report*, testimony of David Mathewson, Director of Planning and Research at the Port of Los Angeles, [http://www.energy.ca.gov/2003_energypolicy/documents/2003-07-11_workshop/2003-07-11_TRANSCRIPT.PDF].
[31] See presentation and comments of Dominic Ferrari of Pacific Energy Partners at the November 29, 2004 workshop for the *2005 Integrated Energy Policy Report*, [http://www.energy.ca.gov/2005_energypolicy/documents/2004-11-29_workshop/2004-11-29_FERRARI_DOMINIC.PDF] and [http://www.energy.ca.gov/2005_energypolicy/documents/2004-11-29_workshop/2004-11-29_TRANSCRIPT.PDF].
[32] Transmix tanks hold combinations of different fuels that have mixed in the pipeline–the end of a shipment of one fuel and the beginning of the shipment of another in the pipe–that cannot be sold as is.
[33] Kinder Morgan press release of February 24, 2005.
[34] Further project details can be found in the *Revised Draft Environmental Impact Report*, November 23, 2004, prepared for the City of Carson by EIP Associates, [http://ci.carson.ca.us/CityDepartments/DevServ/Planning/env/Carson%20Terminal%20Revised%20DEIR%20_2004-11-23.pdf].
[35] Kinder Morgan press release of December 15, 2004.
[36] Kinder Morgan investor presentation, January 2005, [http://www.kindermorgan.com/investor/presentations/2005_Analyst_Conf_04_Products.pdf].
[37] Ibid.
[38] Although the addition of production by Paramount Petroleum and possible expansion by Big West would increase California production of clean fuels and increase crude oil input, the increases are not significant enough to change staff projections of long-term crude oil and clean fuel import requirements.
[39] Percentages by region come from 2002 State Lands Commission data. The larger difference between the north and south for clean fuel imports reflects the fact that almost all of the state's jet fuel imports arrive in the Los Angeles Basin.
[40] http://www.energy.ca.gov/strategic_reserve/documents/2003-04-21_600-03-008D.PDF
[41] It is very difficult to separate clean fuels and crude oil capacities for marine terminals since many of the larger facilities are equipped to offload both commodities.
[42] While likely, an increase in the use of Very Large Crude Carriers is not a certainty. It is possible that a crude pipeline segment extending to the west coast of Canada will be built, allowing marine exports of Canadian crude oil to serve California. The proximity of the west coast of Canada

means that Very Large Crude Carriers would not always be required for shipments to California to be economic.

[43] In 2003, total throughput (imports plus exports) of clean fuels was around 2.4 billion gallons. Assuming 20 percent excess capacity, an additional 600 million gallons could be handled by existing marine terminals.

[44] From an estimate calculated by Stillwater Associates in a report for the Energy Commission in 2003, *California Marine Petroleum Infrastructure Draft Consultant Report*, [http://www.energy.ca.gov/strategic_reserve/documents/2003-04-21_600-03-008D.PDF].

[45] If Kinder Morgan's Carson facility is expanded an additional 700,000 barrels (as planned) and Chemoil converts an additional 500,000 barrels of tankage.

[46] This assumes that pipeline delivery costs do not rise steeply as well.

[47] http://www.arizonacleanfuels.com/news/2005/041405.ACF_release.htm

Appendix: Petroleum Infrastructure Permitting

Introduction

The Energy Commission's *2003 Integrated Energy Policy Report* (*2003 Energy Report*) found that the state's petroleum infrastructure, including marine terminals, storage facilities, pipelines, and refineries, is operating at or near capacity. It further found that the difficulty and uncertainty involved in getting permits is a constraint to the needed expansion of the state's petroleum infrastructure. To address this problem, the Energy Commission recommended streamlining the existing permitting processes for petroleum infrastructure facilities. In May 2004, the Energy Commission adopted an order instituting an informational (OII) proceeding, *Petroleum infrastructure Development Constraints* (Docket 04-SIT-1) to pursue this issue further. As part of that process, the Energy Commission's Siting Committee has conducted information-gathering workshops over the last several months. This appendix summarizes the information gathered in those workshops, addresses issues associated with permitting of petroleum infrastructure, and offers possible improvements to the permitting process.

Background

During the *2003 Energy Report* process, the petroleum industry expressed concern that the length of time and the complexity of acquiring multiple permits from multiple agencies impedes construction of new and the expansion of existing petroleum infrastructure. The Energy Commission staff conducted studies of marine petroleum infrastructure[1] and petroleum storage facilities[2] and reported its finding in the *2003 Energy Report*. Based in part on these reports, the Energy Commission concluded that, "a major barrier to expanding petroleum infrastructure is the difficulty in acquiring construction permits from multiple local, state, and federal authorities."[3] The Energy Commission recommended that, "the state should establish a one-stop licensing process for petroleum infrastructure, including refineries, import and storage facilities, and pipelines that would expedite permits to increase supplies of transportation energy products available to California while maintaining environmental quality." [4]

Early in 2004, in response to the *2003 Energy Report* recommendation, Energy Commission staff consulted with representatives of the Western States Petroleum Association (WSPA), California League of Cities, and city and county representatives in northern and southern California. Staff also met with state and regional agencies, environmental groups, and labor unions. Based on these meetings, staff found that there was no clear consensus regarding the causes of permit delays, the role of the state and local governments in addressing these problems, nor support for a one-stop licensing process for petroleum infrastructure.

Investigation Efforts to Clarify the Issues

Based on the meetings in early 2004, the Energy Commission's Siting Committee determined that additional information was needed to better understand existing processes for licensing of petroleum infrastructure in California. On May 19, 2004, the Energy Commission adopted an order instituting an informational (OII) proceeding (Docket 04-SIT-1) to continue the evaluation of constraints on the state's petroleum refining, importing, storage, and pipeline systems and examine the extent to which improvements in permitting and other options would help expand this infrastructure and increase the state's supply of transportation fuels. As part of that process, the Energy Commission's Siting Committee has conducted information-gathering workshops over the last several months. The following sections provide a brief summary of those workshops.

June 28, 2004 Workshop

The purpose of the first workshop was to inform stakeholders of the state's future needs for expansion of petroleum infrastructure and to gain a better understanding of the problems encountered in permitting petroleum infrastructure. The workshop was attended by industry representatives; local, regional, and state agencies; representatives of port authorities; environmental community groups; and Energy Commission staff. The transcript from the workshop, copies of presentations made during the workshop, and comments received regarding the workshop topics is available at the Energy Commission's website.[5]

The workshop began with presentations by the staffs of the Energy Commission and the California Air Resources Board (CARB) about the findings in the *2003 Energy Report* and in *Reducing California's Petroleum Dependence*, a joint Energy Commission and Air Resources Board Report.[6] Energy Commission staff identified the historical and future trends of the petroleum infrastructure in California. CARB staff identified historical and future trends of regulations to improve air quality that affect fuel specifications and could influence petroleum infrastructure. Major points made during the presentation were as follows:

- Even with successful implementation of the measures identified in the *2003 Energy Report* and *Reducing California's Petroleum Dependence,* demand for petroleum based transportation fuels will increase in the next few years.
- New large refinery development in California is not likely. Refinery capacity at existing refineries will likely continue to increase as efficiency and process improvements are made (i.e., refinery creep).
- California's future supply of petroleum fuels will likely come to an increasing degree from imports of refined products through port facilities in the Bay Area and Los Angeles Basin.

- New port facilities, pipelines, and storage facilities will be needed to import refined products.

After the staff's presentation, two roundtable discussions took place. The first was composed of industry representatives. The representatives generally agreed with staff's assessment of future trends in petroleum infrastructure development in California. They identified a number of problems they believed were delaying timely expansion of petroleum infrastructure, including:

- Excessive data requirements for permit applications
- Inconsistent permitting procedures and information requirements
- Sequential permitting processes
- Inconsistent mitigation requirements between jurisdictions

The second roundtable was composed of port authority and local agency representatives. In general, the local agencies believed that they were expeditiously processing permit applications. However, they did indicate that they do not have a good idea of what projects are important to the state to ensure a reliable and economic supply of transportation fuels. They recommended better coordination and information sharing between the state and local agencies. The agencies mentioned that they have undergone efforts to streamline their permitting process in response to legislation in the 1990s. The agencies also noted that refineries are very complex facilities. Refineries have more emission sources than power plants and involve more complex mechanical and chemical processes than power plants. The agencies believed that they have been working well with industry to address process and environmental improvement at refineries.

The local agencies also believed that environmental justice programs were important to building communication avenues between the agencies and the public and developing a consensus on methods to address environmental and community concerns. These communication avenues were also important in ensuring that local concerns were addressed during the permitting process. The local agencies did not believe a statewide one-stop permitting process would provide adequate opportunity to address local concerns.

In addition to the discussions at the workshop, the Energy Commission received written comments on the workshop discussion topics. Communities for a Better Environment and the Coalition for a Safe Environment filed detailed comments identifying industry failures to construct adequate infrastructure, consider alternative fuels, and protect public health. These groups opposed a statewide one-stop permitting process for petroleum infrastructure.

January 27, 2005 Workshop

On January 27, 2005, the second OII workshop was conducted in the southern California community of Wilmington. The purpose of the workshop was to review best practices used by local, regional, and state agencies for permitting petroleum infrastructure. The transcript from the workshop, copies of presentations made during the workshop, and comments received regarding the workshop topics can be found at the Energy Commission's website.[7]

Those agencies or organizations who provided comments at the workshop included the following: the South Coast Air Quality Management District (South Coast AQMD); the City of Carson; the Western States Petroleum Association (WSPA); Pacific Energy Partners; Los Angeles Export Terminal, Inc.; Oiltanking Americas; the Natural Resources Defense Council (NRDC); Communities for a Better Environment; California Communities Against Toxics; the Del Amo Action Committee; and the Coalition for a Safe Environment.

The South Coast AQMD discussed its permit streamlining activities, its role in carrying out the environmental review process under the California Environmental Quality Act (CEQA), and its Environmental Justice program. The South Coast AQMD first worked to streamline its permitting process in the early 1990s, focusing on assisting businesses in the preparation of more complete permit applications. In 1998, the South Coast AQMD implemented additional permit streamlining initiatives to reduce the number of processing steps, improve communication with applicants, and optimize the structure, management and efficiency of its permit program. It has continued to improve its permitting process through encouraging pre-application meetings and ongoing status meetings with applicants, and implementing structured project processing schedules that identify all permitting activities, including parallel CEQA review. The South Coast AQMD stated that its current permitting processes are effective and efficient and recommended that the Energy Commission consider them as representing "best permitting practices" for the industry.

To better coordinate its permitting processes with cities and counties, the South Coast AQMD provides technical staff support to applicants and local governments on air quality regulatory requirements and analysis methodologies. It has also published a CEQA Air Quality Analysis Guidance Handbook and a Model Air Quality General Plan Element for use by cities and counties to identify appropriate emission mitigation strategies that can be implemented to address the air quality impacts resulting from development. The program, which includes regular "town hall" meetings to discuss local community concerns and air quality issues, focuses on reducing health risks, increasing community access and involvement, and providing economic incentives for economic mitigation of existing public exposure problems.

The City of Carson representative briefly described its permit processes for petroleum infrastructure projects, which include both ministerial permits and discretionary permits, depending on the type, magnitude, and location of proposed

projects. Carson typically serves a lead agency in preparing environmental impact reports, as required by CEQA, only when it is issuing discretionary permits, especially when potential land use conflicts are involved. In cases where most of the issues related to a discretionary project are related to air quality, it may request that the South Coast AQMD serve as the lead agency. The South Coast AQMD serves as lead agency on all projects for which Carson issues ministerial permits.

The Western States Petroleum Association (WSPA) described the circumstances in the petroleum market that have led to higher prices for gasoline and other petroleum products. WSPA spoke in support of the Energy Commission's evaluation of the permitting process as a constraint to expansion of the State's petroleum infrastructure facilities. WSPA proposed working cooperatively with local, regional, and state agencies under their current permitting authorities to identify and promote the use of "best permitting practices" consistent with the requirements of CEQA to maintain environmental protection. WSPA stated that such a cooperative approach to permitting would be the best way to streamline the overall permitting process in order to provide adequate and reliable fuel supplies for California.

Pacific Energy Partners (PEP) spoke about the need for additional marine import capacity to accommodate increasing demands for petroleum fuels, including an additional 400,000 barrels a day of imported crude oil in the Los Angeles area over the next 10 years. Projects such as PEP's deepwater petroleum import terminal in the Port of Los Angeles face serious challenges due to demand for port land, local community concerns, and conflicts between all of the different agencies that have decision making authority. PEP underscored the importance of getting state, regional, and local agencies to work together to clarify and balance the state's need for petroleum fuels and the need to address local community and regional needs and concerns. Oiltanking Americas, which builds and operates terminal facilities and is currently involved with the Port of Long Beach, emphasized the need to provide regulatory clarity to facilitate the needed infrastructure development. Los Angeles Export Terminal, Inc. suggested that consolidating of permitting would avoid the problem of needed projects being stymied by a single agency.

The Natural Resources Defense Council (NRDC) pointed out that the permit review process for petroleum-related activities is much more difficult than for power plants because of the much greater complexity of the facilities involved. For this reason, arbitrarily simplifying or streamlining the required permit review process is imprudent. In its view, any "best permitting practices" considered must include meaningful local public participation in decision making, which is a fundamental tenet of environmental justice. NRDC stressed that permitting must remain at the local level where elected officials are more knowledgeable about local conditions and are more responsive to local concerns. "Best permitting practices" should also take into account the cumulative health and nuisance impacts of projects on local communities and should provide adequate opportunities for administrative and judicial review.

Communities for a Better Environment and the Del Amo Action Committee representatives both supported the comments made by NRDC, stressing the need for public participation and local control. California Communities Against Toxics (CCAT) raised concerns about the lack of adequate appeal opportunities in the Energy Commission's power plant siting process (used as a model for petroleum infrastructure permitting) and the adequacy of the Energy Commission process in addressing local community and environmental justice concerns. CCAT said that local permitting processes provide better opportunities for citizen appeals and for addressing local community concerns. The Coalition for a Safe Environment pointed out what it felt were two deficiencies in the existing permitting processes: they do not provide adequate public health protection and do not provide public access to important information about project impacts. It did not state a position regarding state versus local permitting processes.

February 14, 2005 Workshop

On February 14, the third OII workshop was conducted in the northern California city of Martinez. The purpose of this workshop was to provide an opportunity for agencies in northern California to discuss the topics discussed at the previous southern California workshop. The transcript from the workshop, copies of presentations made during the workshop, and comments received regarding the workshop topics can be found at the Energy Commission's website.[8]

Those agencies or organizations that provided comments at the workshop included the following: the Bay Area Air Quality Management District (Bay Area AQMD); the County of Contra Costa; the City of Benecia; the San Francisco Bay Conservation and Development Commission (BCDC); the Western States Petroleum Association (WSPA); the West Coast Toxics Coalition of Richmond; Communities for a Better Environment; The League of Women Voters; and the California State Pipe Trades Council.

The Bay Area AQMD summarized its "best permitting practices" for petroleum infrastructure facilities as including the following:

- Aggressive review of permit applications and regular status reporting to management.
- The use of experienced engineers to review complex projects, such as refinery modifications, with close supervisor oversight and support.
- Frequent contact with applicants at both staff and management levels.
- Pre-application meetings with applicants to define the proposed project and the information required to complete the permit review process.

The Bay Area AQMD avoids being lead agency under CEQA because it is a single-purpose agency that is focused only on project compliance with air quality rules and regulations. Therefore, if a project requires a local land use permit, the applicable

city or county serves as lead agency. The Bay Area AQMD has prepared CEQA guidelines for use by local agencies, typically provides technical support to cities or counties, provides air quality comments on draft CEQA documents, and holds the issuance of its permits until the CEQA process is complete.

The Bay Area AQMD has worked with local communities to develop an Environmental Justice Program similar to the one implemented by the South Coast Air Quality Management District. To implement the program, the Bay Area AQMD is conducting cumulative impact assessments to identify impacted communities. It will then develop procedures to modify permitting, compliance, and public involvement processes to help address identified environmental justice problems.

The Bay Area AQMD recommended against establishing a state petroleum infrastructure permitting process. It recommended instead the following actions to help improve the existing local permitting process for petroleum infrastructure facilities:

- Improved communication between permitting agencies and share information on "best practices."
- Participation by the Energy Commission in local permitting processes to identify state needs and concerns related to petroleum infrastructure modifications or expansion.
- Energy Commission permitting authority, but with a more extensive appeal process to allow greater public participation in decision making.

The City of Benecia described its use permit process, which was established in 1993 so that the city could review and approve the operation or expansion of existing petroleum infrastructure facilities in its jurisdiction. Use permits are required only for modifications to existing facilities that extend beyond the existing boundary of the facility or for alterations that exceed $28 million or substantially alter the character or operation of the existing use. When Benecia issues such discretionary permits, it acts as the lead agency in preparing the required environmental document. Using this "threshold" approach, Benecia provides the owners with a great deal of flexibility in how they maintain and modify their facilities, but provides clearly defined criteria for when the city needs to exercise its permitting authority. Although the city does not have an environmental justice program, it does require that a buffer area of non-residential uses be maintained around the refinery facilities to avoid or limit impacts to the surrounding residential community. This has served to limit the concerns that local citizens have about impacts of the refinery on residential areas.

The city believes that its use permit process works well and does not want to give up its permitting authority over refineries and related facilities. The city pointed to recent permitting of the Valero Refinery Improvement Project as a good example of how the process can benefit both the city and the refinery operators. The proposal consisted of a number of projects that Valero plans to carry out (both below and above the "threshold"). This allowed Benecia to look at all of the proposed projects as a group,

and to consider the cumulative impacts in a more comprehensive way in order to define annual reporting and compliance monitoring requirements. It also gave Valero more certainty in carrying out its planned improvement activities over time.

BCDC described its role in permitting, regulating, and planning for the petroleum industry in the San Francisco Bay and its shoreline. As a state agency with regional authority, BCDC's procedures and jurisdiction are different than those of the Energy Commission and local agencies. BCDC does not usually have a significant role as a lead agency under the California Environmental Quality Act (CEQA), but typically serves as a responsible agency in reviewing and commenting on environmental documents. Additionally, BCDC has no legal basis for granting or denying permits in its jurisdiction based on environmental justice issues. Nonetheless, BCDC is sensitive to environmental justice and addresses environmental justice primarily through its authority to require maximum feasible public access to the Bay shoreline consistent with a proposed project.

Marine facilities within BCDC's jurisdiction include 26 marine terminals accommodating approximately 3,300 oil transfers per year. BCDC plays an important role in four primary capacities related to petroleum industry operations and development in the San Francisco Bay area: (1) designating priority use areas for water-related industry in the *San Francisco Bay Plan*; (2) planning for and processing permits for dredging near marine terminals; (3) issuing permits for the construction, operation, and repair of marine terminals and pipelines; and (4) participating in the Oil Spill Prevention and Response program and the Harbor Safety Committee. The majority of BCDC permits for the petroleum industry are for dredging projects near marine terminals. BCDC clearly recognizes the importance of the petroleum industry in the San Francisco Bay area and has successfully worked with the industry to plan for future development and expedite permit processing, while at the same time protecting San Francisco Bay.

In processing applications for dredging permits, the BCDC coordinates closely through a joint long-term management strategy with the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the Regional Water Quality Control Board, and the California Department of Fish and Game. This provides a predictable and uniform multi-agency process with state and federal permits issued simultaneously for dredging and disposing of dredge materials in the Bay. BCDC also participates in a coordinated oil spill prevention effort among state and federal agencies to insure that San Francisco Bay resources are protected from oil spills.

The West County Toxics Coalition (WCTC), located in the City of Richmond, raised a number of environmental justice concerns about existing petroleum facilities in Richmond and the northern Bay Area. WCTC emphasized that numerous existing disproportionate environmental impacts on poor communities from petroleum facilities are not being addressed due to corruption and special interest money. It emphasized that the decisions about petroleum facilities should continue to be made on the local level where community groups can participate in the process and hold

the decision makers accountable. Communities for a Better Environment spoke in support of the comments made by WCTC.

The League of Women Voters commented that the state should have a greater role in land use planning to be able to present a broader vision for guiding growth and providing for energy infrastructure while respecting and addressing the needs and concerns of local communities. The League felt that permitting of petroleum facilities should not be either local or state, but should involve both levels of government to benefit from their respective expertise.

The California Pipe Trades Council (CPTC) said that perceived difficulties with local permitting are not the causes of high gasoline prices. Historically, permits for major project expansions have been processed expeditiously, most permits for smaller projects have been issued quickly, and many modifications don't require local land use permits. CPTC felt that high gasoline prices are the result of increasing world wide demand for oil and the economic decisions of oil industry members. CPTC also expressed the belief that the most important additional required infrastructure is storage for petroleum and petroleum products. However, CPTC pointed out that it is difficult to site storage in urban areas where supplies are needed but land use conflicts are greater. Under these circumstances, according to CPTC, multiple permit reviews are appropriate to address local community concerns.

The Western States Petroleum Association (WSPA) described the circumstances in the petroleum industry that have led to higher prices for gasoline and other petroleum products. WSPA spoke in support of the Energy Commission's evaluation of constraints on expansion of the State's petroleum infrastructure facilities and the need for improvements to the permitting processes. WSPA proposed working cooperatively with local, regional, and state agencies under their current permitting authorities to identify and promote the use of "best permitting practices" consistent with the requirements of CEQA to maintain environmental protection. WSPA stated that such a cooperative approach to permitting would be the best way to streamline the overall permitting process in order to provide adequate and reliable fuel supplies for California.

The Contra Costa County Planning Department described its land use permitting process and what it saw as opportunities for improving the permitting process for any agency. It has a three-step process: developing a complete application, conducting the CEQA process, and holding a public hearing. To streamline the process, the first and second step should be done concurrently.

The county, as a matter of policy, recognizes the importance of new capital investment in refineries and other industries in its jurisdiction while requiring environmental responsibility. To support that policy, and to adequately protect the health and safety of the local community, the Planning Department has developed a number of strategies as part of its project permitting process. First, it has a very close working relationship with the Bay Area AQMD staff from the very beginning in

selecting contractors, reviewing applications, carrying out the CEQA process, and participating in the hearing process. The Planning Department also depends on the staff of the California Air Resources Board to provide technical support.

Second, applicants are expected to provide qualified and committed staff that can prepare a complete application, answer important questions, and provide timely data to facilitate the permit review process. Those applicants who reach out early to involve the public in their facility planning and development process and continue to engage with them also help to facilitate a timely permitting process.

Third, the Planning Department also works closely with staff from the County Health Department during the permit review and CEQA processes to address hazardous materials issues related to accidental releases and the risk of public exposure. This approach recognizes that it is important to partner at the beginning of the permit review process with any lead agency that has the unique skills needed to understand and analyze specific issues raised by a proposed project.

Conclusion

There is substantial opposition to a statewide one-stop permitting process. The primary concern on the part of stakeholders is the feeling that state decision makers may be too far removed from local concerns to give them adequate consideration. There is also a feeling that any specific permitting problems could be better addressed by a local process. However, the Energy Commission staff believes that there are steps the state could take to address permitting problems. These have been presented in the *Recommendations* section of this report and are reproduced below.

- The Energy Commission should develop “best permitting practices” for petroleum infrastructure projects.

- The Energy Commission should serve as a permit facilitator to ensure that statewide interests are considered in permitting processes by coordinating multiple agency reviews.

- The Energy Commission should consider a statewide one-stop permitting process for petroleum infrastructure projects that cross jurisdictional boundaries. Such projects would likely benefit from a procedure that consolidates environmental review for all jurisdictions in a single process.

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[1] California Energy Commission, April 2003, *California Marine Petroleum Infrastructure*, Consultant Report, California Energy Commission, Sacramento, CA, P600-03-008.

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[4] California Energy Commission, December 2003, *2003 Integrated Energy Policy Report*, pp 37, California Energy Commission. Sacramento, CA, P100-03-019F.

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[6] California Energy Commission, July 2003, *Reducing California's Petroleum Dependence,* A Joint Energy Commission and Air Resources Board Report. Sacramento, CA, P 600-03-005.

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